

REMARKS

This RCE is intended as a full and complete response to the Final Office Action dated January 26, 2007, having a shortened statutory period for response set to expire on April 26, 2007. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1-18, 20-45, 49, 50, 55, and 69-95 remain pending in the application and after entry of this response. Claims 1, 3-10, 14-18, 20, 21, 23-27, 33-35, 42, 50, 72-78, 80, 86, and 87 have been amended and new claims 91-95 has been added. No new matter has been added by either the amendments or new claims.

Claims 1-18, 20-45, 49, 50, 55, and 69-90 are rejected by the Examiner.

Claim Rejections Under 35 USC § 103

Claims 1-18, 20-45, 49, 50, 55, and 69-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Chapman* (US 5,504,491), *Tubel* (US 5,730,219), *Yamazaki* (US 6,867,752), and *Alft* (US 2004/0190374). Regarding amended claim 1 and its dependents, the Examiner cites *Tubel* as disclosing the first element of claim 1 and *Alft* for disclosing the second and third elements of claim 1.

Alft does not disclose "providing a human-portable data communications module to a person on the drilling rig". *Alft* discloses that the tracker unit 28 is located along a path of the boring tool 24 (FIG. 2 and paras. [0057], [0075], [0086], [0087], [0090], [0091], [0166]-[0173], and [0186]-[0188]). *Alft* never discloses that the tracker unit 28 is located on the boring machine 12. Further, *Alft* never discloses that the universal controller 25 is human-portable. *Alft* discloses that the universal controller is installed on or integral with the boring machine 12 (para. [0126]). *Alft* also does not disclose "establishing an at least two-way data communication connection between the portable data communications module and the at least one off-site location via the Internet". *Alft* does not disclose that a connection is established between the tracker unit 28 and the central control site (paras. [0125] and [0130]). *Alft* also does not disclose "monitoring activities on the drilling rig via the portable communications module and the at least two-way data communication connection by a person at the off-site location". *Alft* does not

disclose any communication between the tracker unit 28 and the central control site. *Alft* also does not disclose "drilling a wellbore to an oil and/or gas bearing formation". *Alft* discloses the boring machine 12 for trenchless installation of utility lines (para. [0003]).

Therefore, claim 1 and its dependents are patentable over *Chapman*, *Tubel*, *Yamazaki*, and *Alft*.

Regarding amended claim 27 and its dependents, none of the cited references, either alone or in combination, teach, suggest, or disclose a portable communication attachment attached to a skull-protective hard hat. The Examiner cites col. 3, line 65 to col. 4, line 67 of *Yamazaki* as disclosing this element. None of *Yamazaki*'s embodiments show the HMD as offering any protection to a user's skull (FIGS. 3, 4, and 13). None of the other references disclose a portable communication attachment attached to a skull-protective hard hat. Therefore, claim 27 and its dependents are patentable over *Chapman*, *Tubel*, *Yamazaki*, and *Alft*.

Regarding claim 42 and its dependents, none of the cited references, either alone or in combination, teach, suggest, or disclose providing a communications module having an external camera to an on-site person and transmitting an image or video corresponding to the on-site person's view to the off-site person using the camera. The Examiner overlooks the external camera in the rejection of claim 42. In the rejection of claim 22, the Examiner cites col. 9, line 55-58 of *Yamazaki* as disclosing an external camera. The cited portion of *Yamazaki* discloses a camera aimed at a user's eyes so that movement of the eyes may be tracked for corresponding movement of a pointer. None of the other references disclose either providing a communications module having an external camera to an on-site person or transmitting an image/video to the off-site person. Therefore, claim 42 and its dependents are patentable over *Chapman*, *Tubel*, *Yamazaki*, and *Alft*.

Regarding dependent claim 2 on its own merits, the Examiner cites col. 5, lines 63-col. 6, line 42 of *Tubel* as disclosing remotely directing activities at the on-site location. The cited portion discloses remotely controlling production wells (and/or a plurality of zones in each well) from a remote location. The cited portion does not disclose directing activities via the portable communications module from the off-site

location. *Tubel* discloses a handheld terminal 300 but only discloses use for programming a tool (col. 10, line 59-col. 11, line 34).

Regarding amended dependent claim 3 on its own merits, the Examiner cites col. 8, lines 4-67 of *Tubel* as disclosing determining positional information of at least one person or object from the on-site location and monitoring the positional information from the off-site location. The cited portion discloses a surface control system that polls a downhole device and controls the position of the device. The cited portion does not disclose determining positional information of a person on the rig.

Regarding amended dependent claim 5 on its own merits, the Examiner cites col. 19 of *Tubel* as disclosing billable activities. The cited portion discloses advanced formation evaluation during production and not billing a procedure related to activities.

Regarding amended dependent claim 7 on its own merits, the Examiner cites col. 8, lines 64-67 of *Tubel* as disclosing fishing activities. The cited portion discloses wells 14 extending from a platform (1 to N) through water 16, to ocean floor 18, and to formations under the ocean floor. Respectfully, this passage does not describe recovering at least a portion of a damaged or obstructed drill string in a wellbore.

Regarding amended dependent claim 8 on its own merits, the Examiner cites col. 8, lines 3-55 of *Tubel* as relating a downhole sensor to fishing activities. The cited portion discloses controlling production zones in a wellbore and does not relate in any way to recovery of a damaged/obstructed drill string as recited in claim 7.

Regarding amended dependent claim 9 on its own merits, the Examiner cites col. 18, lines 20-67 of *Tubel* as disclosing a sensor that gathers information related to the condition of a tubular string in the wellbore. The cited portion discloses formation evaluation sensors and not a sensor that gathers information related to the damaged/obstructed drill string.

Regarding amended dependent claim 11 on its own merits, the Examiner cites col. 4, lines 38-48 of *Chapman* as disclosing using GPS equipment to determine positional information. Chapman discloses that the remote unit 1 may be a vehicle but never discloses a person (col. 5, lines 7-10) as now recited in amended claim 3.

Regarding dependent claim 13 on its own merits, the Examiner cites col. 20, lines 13-67 of *Tubel* as disclosing transmitting certain kinds of data (i.e., status, usage,

and location) to a rental center. The cited portion of *Tubel* discloses performing a seismic study of a formation.

Regarding amended dependent claim 14 on its own merits, the Examiner cites col. 9, line 58-col. 10, line 67 of *Tubel* as disclosing the module configured to be worn by, or attached to, the on-site person. The cited portion discloses handheld terminal 300 but does not disclose that is attached to or worn by the person on the rig.

Regarding amended dependent claim 15 on its own merits, the Examiner cites col. 23, line 46 to col. 24, line 67 of *Tubel* as disclosing a portable communications module configured to be detachably attached to a hardhat. The cited portion of *Tubel* discloses landing a sensor in a side pocket mandrel in the well and subsurface valve having sensors. Further, as discussed above, *Yamazaki* does not disclose a skull protective hardhat.

Regarding amended dependent claim 16 on its own merits, the Examiner cites col. 3, lines 65-67 of *Yamazaki* as disclosing measuring lengths of pieces of tubulars utilizing the communications module. The cited portion of *Yamazaki* discloses a user, an HMD worn by the user, and a portable information terminal.

Regarding amended dependent claim 17 on its own merits, the Examiner cites col. 18, lines 20-67 of *Tubel* as disclosing automatic recording of lengths of tubulars prior to insertion in the wellbore. The cited portion of *Tubel* discloses mounting sensors in a string of production tubing and not recording their lengths by scanning a barcode or RFID tag.

Regarding amended dependent claim 18 on its own merits, the Examiner cites col. 3, lines 65-67 of *Yamazaki* as disclosing measurement of torque developed between adjacent pieces of tubular being assembled. The cited portion of *Yamazaki* discloses a user, an HMD worn by the user, and a portable information terminal.

Regarding amended dependent claim 20 on its own merits, the Examiner cites col. 2, lines 4-7 of *Yamazaki* as disclosing providing a communications module on a hardhat and log-on data facilitating billing of hardhat usage. The cited portion of *Yamazaki* discloses displaying an image on the HMD worn by the user on his/her head and transmitting information between the HMD and the portable information terminal.

Regarding amended dependent claim 21 on its own merits, the Examiner cites col. 16, lines 5-67 of *Tubel* as disclosing that the on-site person can manually position the communications module. The cited portion discloses detail of the downhole controller 22 and not that the person on the rig can manually position the module.

Regarding amended dependent claim 22, the rejection is discussed above with reference to claim 27.

Regarding amended dependent claim 23 on its own merits, the Examiner cites col. 24 of *Tubel* as disclosing a hard hat and a global positioning component physically connected to the hard hat. The cited portion discloses a latching mechanism for landing a monitoring device in a side pocket mandrel. Claim 23 has been amended to clarify GPS equipment (see <http://www.m-w.com/dictionary> "GPS" - "a navigational system using satellite signals to fix the location of a radio receiver on or above the earth's surface").

Regarding amended dependent claim 24 on its own merits, the Examiner cites col. 15, lines 14-67 of *Tubel* as disclosing a "hard hat" having a "flip down" screen for visual display of data. The cited portion discloses that one of the downhole sensors may be a television camera.

Regarding amended dependent claim 25 on its own merits, the Examiner cites col. 14, line 34-col. 15, line 67 of *Tubel* as disclosing a hard hat and an on-site computer, wherein data is transmitted therebetween. The cited portion discloses downhole control system 50 and its interface with downhole sensors and the surface.

TSM

Regarding independent claims 1 and 42 (and their dependents), specifically, teaching, suggestion, or motivation (TSM) to combine, the Examiner states in the Final Office Action that *Alft* is directed to providing an earth penetrating apparatus for use with a boring machine, such as a horizontal directional drilling machine. Another possible TSM provided by the Examiner is that *Alft* discloses a communication link established via the drill string which may comprise a wire or fiber passing through the drill string and a hand held tracker unit and that *Tubel* discloses transceivers for communication

between the surface of a well and downhole equipment and a telemetry device for communication between the surface and a remote location.

Respectfully, Appellants fail to recognize how Alft's disclosure of a boring machine, specifically, a horizontal drilling machine and a wired drill string and that Tubel discloses communication between downhole equipment, the surface, and a remote location meets the Examiner's burden of asserting a motivation to combine. The Examiner has failed to provide any analysis including elements, such as: a problem one of ordinary skill would be seeking to solve, the knowledge one of ordinary skill would possess, the design methodology one of ordinary skill would employ, and/or why one of ordinary skill would anticipate success in combining the references.

Conversely, *Alft* teaches away from claim 1, specifically providing a portable data communications module to a person on the rig and monitoring activities by a second person at the off-site location and claim 42, specifically providing a communications module having an external camera to an on-site person and communicating one or more procedures from an off-site person to the on-site person by criticizing open loop control schemes utilizing human input concerning drilling activities for being slow and inaccurate (paras. [0006] and [0008]) and as follows:

Such dependency on human intervention within the control loop of a drilling system generally decreases overall excavation productivity, increases the delay time to effect necessary changes in drilling system activity in response to acquired drilling machine and drill head sensor information, and increases the risk of injury to operators and the likelihood of operator error.

(*Alft*, paragraph [0009]). Throughout his Detailed Description section, Alft emphasizes the importance of a real time closed loop control system having a response time of one second or less (paras. [0045] and [0046]). Alft realizes that human intervention in the control system will not achieve this response time:

By way of example, a near-instantaneous alteration or halting of boring tool progress may be effected by the universal controller 25 via the closed-loop control loops L_A or L_B depicted in FIG. 2 or other control loop upon detection of an unknown obstruction without experiencing delays associated with human observation and decision making.

(*Alft*, paragraph [0092], emphasis added). In the end, *Alft* simply concludes that optimal control over the drilling process includes too many variables that require too many decisions for even a highly skilled operator to handle:

In accordance with one embodiment for controlling the boring machine using a closed-loop, real-time control methodology of the present invention, overall boring efficiency may be optimized by appropriately controlling the respective output levels of the rotation pump 146 and the thrust/pullback pump 144. Under dynamically changing boring conditions, closed-loop control of the thrust/pullback and rotation pumps 144 and 146 provides for substantially increased boring efficiency over a manually controlled methodology...

Although the rotation and thrust/pullback pump controls permit an operator to modify the output of the thrust/pullback and rotation pumps 144 and 146 on a gross scale, those skilled in the art can appreciate the inability by even a highly skilled operator to quickly and optimally modify boring tool productivity under continuously changing soil/rock and loading conditions.

(*Alft*, paragraphs [0208] and [0209], emphasis added; see also paragraphs [0217], [0273], and [0274]). Therefore, one of ordinary skill contemplating an improvement to *Alft* would be led toward a completely automated control system and away from a communication system involving one person, much less two people.

Tubel also teaches away from claims 1 and 42. *Tubel*'s primary teaching is that of an automated downhole control system for production of a completed offshore well:

More particularly, this invention relates to a method and apparatus for automatically controlling petroleum production wells using downhole computerized control systems.

(Col. 1, lines 14-17.) *Tubel* is so serious about automating control of offshore production that he goes as far as advocating elimination of a production platform:

For example, as mentioned, all of these prior art systems generally require a surface platform at each well for supporting the control electronics and associated equipment. However, in many instances, the well operator would rather forego building and maintaining the costly platform. Thus, a problem is encountered in that use of present surface controllers require the presence of a location for the control system, namely the platform.

(Col. 3, line 60, col. 4, line 1, emphasis added.) While advocating the elimination of the production platform, *Tubel* touts five very significant advantages that would be obtained

by a fully automated control system: cost savings, risk and liability savings, avoidance of delay, avoiding problems caused by failure of communication to the surface, and reliance of multiple wells on a single surface controller. *Tubel* recognizes that the cost savings resulting from a fully automated control system would be in the millions:

Presently, if a problem is detected at the well, the customer is required to send a rig to the wellsite at an extremely high cost (e.g., 5 million dollars for 30 days of offshore work). The well must then be shut in during the workover causing a large loss in revenues (e.g., 1.5 million dollars for a 30 day period).

(Col. 4, lines 20-24.) *Tubel* explains that the risk and liability savings are realized by reducing the risk of spills and eliminating personnel at the rig site:

Associated with these high costs are the relatively high risks of adverse environmental impact due to spills and other accidents as well as potential liability of personnel at the rig site. Of course, these risks can lead to even further costs.

(Col. 4, lines 24-28.) *Tubel* laments that a well needing maintenance may sit idle until multiple problems in an area justify the cost of a platform:

Because of the high costs and risks involved, in general, a customer may delay important and necessary workover of a single well until other wells in that area encounter problems. This delay may cause the production of the well to decrease or be shut in until the rig is brought in.

(Col. 4, lines 28-33.) *Tubel* realizes the difficulty of sustaining a wellbore to surface communication system in the harsh wellbore environment:

Still another problem associated with known surface control systems such as the type disclosed in the '168 and '112 patents wherein a downhole microprocessor is actuated by a surface signal is the reliability of surface to downhole signal integrity. It will be appreciated that should the surface signal be in any way compromised on its way downhole, then important control operations (such as preventing water from flowing into the production tubing) will not take place as needed.

(Col. 4, lines 1-9.) *Tubel* even realizes the fallibility of the surface control system and the cascading effect of failure thereof:

In multilateral wells where multiple zones are controlled by a single surface control system, an inherent risk is that if the surface control system fails or otherwise shuts down, then all of the downhole tools and

other production equipment in each separate zone will similarly shut down leading to a large loss in production and, of course, a loss in revenue.

(Col. 4, lines 10-15). *Tubel* concludes that the optimal solution is an automated control system that is completely self-reliant:

An important feature of this invention is that the automatic control is initiated downhole without an initial control signal from the surface or from some other external source.

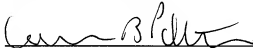
(Col. 4, lines 52-55; see also col. 5, lines 37-53 and col. 14, lines 34-42; and col. 3, lines 30-53.) Therefore, as with *Alft*, one of ordinary skill contemplating an improvement to *Tubel* would be led toward a completely automated control system and away from a communication system involving one person, much less two people.

Chapman discloses a GPS system for emergency response vehicles. *Yamazaki* discloses a wireless head mount display (HMD) unit for e-mail and browsing the Internet and does not even suggest an industrial application. Therefore, the Examiner has not provided a sufficient TSM to combine the references and certainly not one that overcomes the teaching away of *Alft* and *Tubel*.

Conclusion

Having addressed all issues set out in the Final Office Action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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